CLAIMS

1. A silicon nitride wear resistant member composed of a ceramic sintered body containing 55 to 75 mass% of silicon nitride, 12 to 28 mass% of silicon carbide, 3 to 15 mass% of at least one element selected from the group consisting of Mo, W, Ta, and Nb in terms of silicide thereof, and 5 to 15 mass% of grain boundary phase composed of a rare earth element-Si-Al-O-N, the wear resistant member having an electrical resistance of 10^7 to 10^4 Ω·cm, a porosity of 1% or less, and a three point bending strength of 900 MPa or more.

2. A silicon nitride wear resistant member according to Claim 1, wherein the wear resistant member has a fracture toughness of 6.0 MPa·$m^{1/2}$ or more.

3. A silicon nitride type wear resistant member according to Claim 1, wherein the wear resistant member further contains 5 mass% or less of at least one element selected from the group consisting of Ti, Hf, and Zr in terms of the oxide thereof.

4. A silicon nitride wear resistant member according to one of Claims 1 to 3, wherein a rolling life defined as a rotation number of steel balls rolling along a circular track formed on the wear resistant member formed of the silicon nitride sintered body until a surface of the silicon nitride wear resistant member peels off is 1 x 10^7 or more, when the rolling life is measured in such a manner that a circular track having a diameter of 40 mm is set on the upper surface of the plate-shaped wear resistant member, three rolling steel balls each having a diameter of 9.525 mm and composed of SUJ2 are provided on the circular track, thereby to

form a thrust type bearing testing machine, and the rolling steel balls are rotated on the track at a rotation speed of 1200 rpm under a condition of being applied with a load of 3.92 KN.

5. A silicon nitride wear resistant member according to any one of Claims 1 to 3, wherein the silicon nitride sintered body has a crush strength of 200 MPa or more, and a rolling fatigue life defined as a time until a surface of rolling balls composed of the silicon nitride wear resistant member rolling along a circular track on a steel plate peels off is 400 hours or more, when the rolling fatigue life is measured in such a manner that three rolling balls each having a diameter of 9.525 mm are formed from the silicon nitride wear resistant member, the three rolling balls are provided on the circular track having a diameter of 40 mm set on the upper surface of a steel plate formed of SUJ2, thereby to form a thrust type bearing testing machine, and the rolling ball are rotated at a rotation speed of 1200 rpm on the track under a condition of being applied with a load so as to impact a maximum contact stress of 5.9 GPa to the balls.

6. A method of manufacturing a wear resistance member composed of a silicon nitride sintered body comprising the steps of: preparing a material mixture by adding 12 to 28 mass% of silicon nitride, 3 to 15 mass% of at least one compound selected from the group consisting of the carbides, the silicides, and the oxides of Mo, W, Ta, and Nb in terms of the silicide thereof, 2 to 10 mass% of a rare earth element in terms of the oxide thereof, 2 to 10 mass% of aluminum in terms of the oxide thereof, and 5 mass% or less of at least one element selected from the group consisting of Ti, Hf, and Zr in terms of oxide thereof to silicon nitride powder

containing 1.7 mass% or less of oxygen and 90 mass% or more of α phase type silicon nitride, and having an average grain size of 0.1 μm or less; molding the material mixture to form a compact; degreasing the compact; and sintering the compact in a non-oxidizing atmosphere at a temperature of 1850°C or lower.

7. A method of manufacturing a silicon nitride wear resistant member according to Claim 6, wherein the method further comprising a step of conducting a hot isostatic pressing treatment (HIP) in a non-oxidizing atmosphere of 30 MPa or more at a temperature of 1800°C or lower after completion of the sintering step.